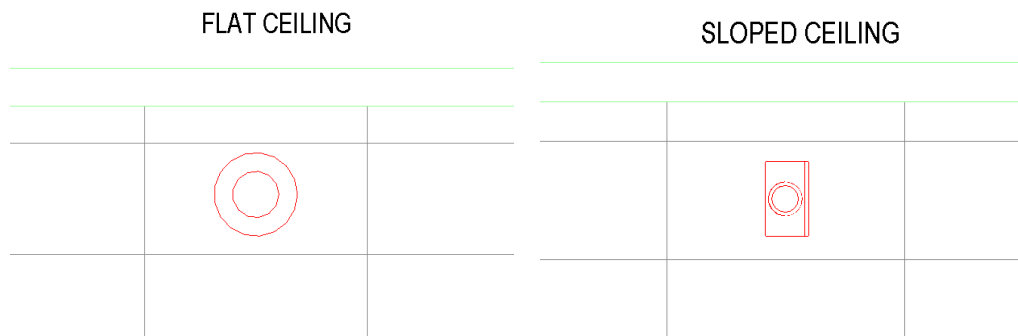


Sloped Ceilings, there is some hope.

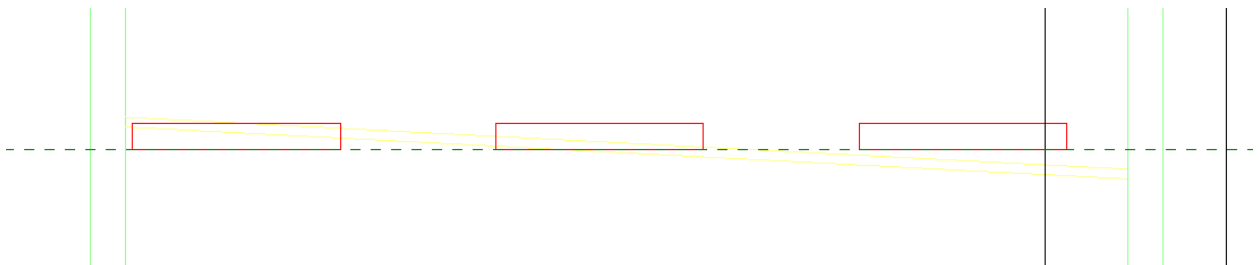
As many know, dealing with sloped ceilings in Revit can be a difficult task. With out of the box families, users must decide if symbology is correct in plan view for accurate plans or in section views, for accurate clash detection. With a typical face based family on a sloped ceiling, the symbolic line graphics are no longer visible in your plan view. The 3d representation of the device/fixture is visible, yet skewed in plan view by the slope of the ceiling. This is because symbolic lines can only be displayed when they are perpendicular to the view plane.

There are several options to work around this.

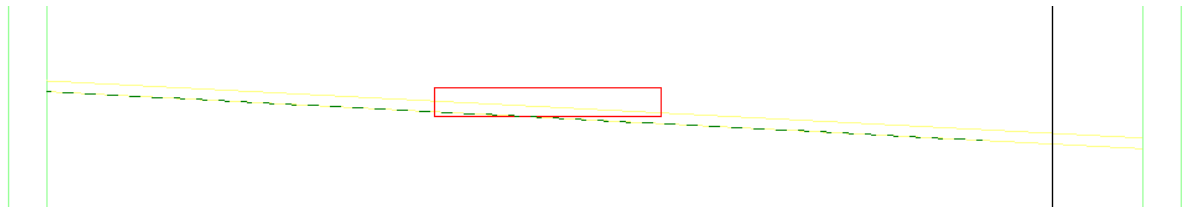
- Fixtures can be placed as is as is and noted as being located in a sloped ceiling. It works, but doesn't provide a clean set of documents.



- Model lines can be used for plan symbols instead of symbolic lines. This allows the plan symbol to appear, but it will not look the same at fixtures located in flat ceilings. Model will also appear in section views.
- Fixtures can be inserted on a work plane that is parallel to the floor. This provides a correct plan symbol, but 3d representations will be inaccurate. If the fixtures moved, there is nothing to prevent the fixture from having fixtures floating in space. Typically, architects will point this out.



- Create a work plane that slopes with the ceiling. This is similar to the option above except this option will keep fixtures aligned with the ceiling the your 3d representation will still be inaccurate.

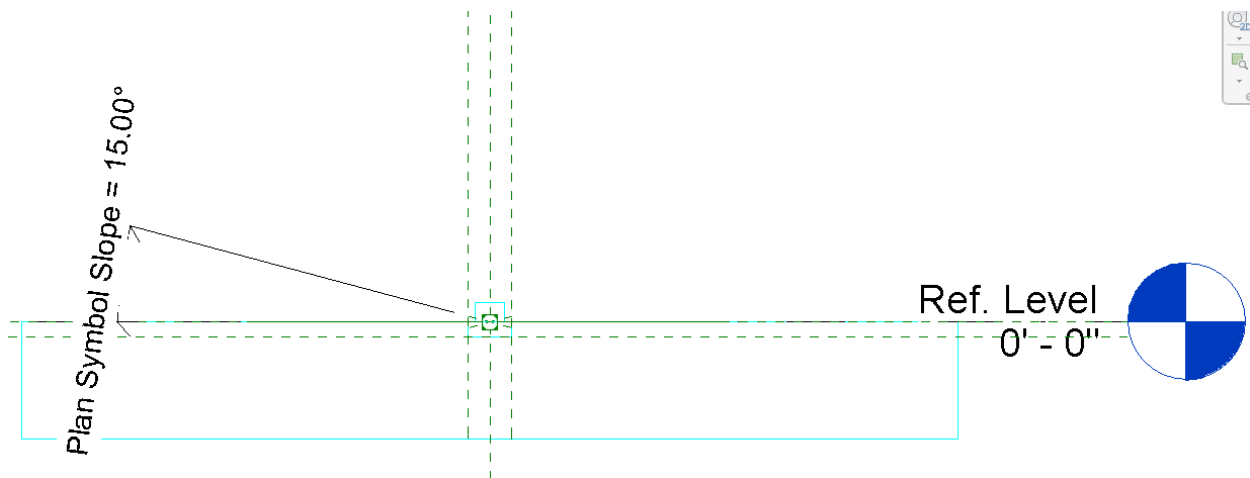


In the event the project or client requires that the 2d and 3d are both accurate, here is a new option. The concept of this approach is to rotate the plan symbol to be parallel to the floor within the family. Families placed on a ceiling with a 5 degree slope, will rotate the plan symbol 5 degrees in the opposite direction so that it is once again parallel to the floor. It will show the symbolic lines just as if they were placed on a flat ceiling. This option requires users to know is the ceiling slope angle and the direction of the slope for asymmetric fixtures. Fixtures can be separated into 5 basic groups.

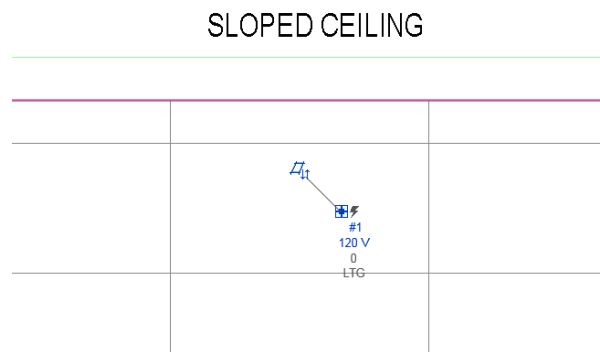
1. Fixtures that use symbols that are not drawn to scale and use generic annotations. (ceiling receptacles)
2. Fixtures that use symbols that are drawn to scale and are symmetrical. (can lights)
3. Fixtures that use symbols that are drawn to scale and are asymmetrical. (2x4 light fixtures)
4. Fixtures that attach to a sloped surface, but both the symbolic lines and 3d representations are parallel to the floor. (pendant lights)
5. Fixtures that attach to a sloped surface, but both the symbolic lines and 3d representations are parallel to the floor. (2x4 pendant lights)

Most of the steps are the same, no matter the fixture group. This method requires you to know the direction of the ceiling slope in order to place asymmetric fixtures correctly. This is because Revit only allows the slope of a family's plane to be modified in one direction. This may seem like a lot of work, but keep in mind how many families this applies to and how often sloped ceilings, or sloped structure is an issue.

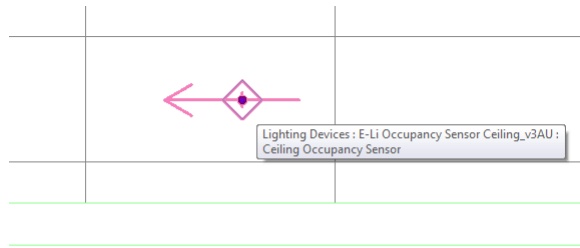
Group 1. Families in this group are created with Generic Annotation families nested into a Face Base Family Category, called "Lighting Device 1". These are the easiest families to modify. Nest the "Lighting Device 1" family into a second family "Lighting Device 2". In "Lighting Device 2", create a reference plane and name it "Front". Next add an angle parameter called "Plan Symbol Slope".



“Lighting Device 1” which has the Generic Annotation nested into it, needs to be set as a “Shared” family in the Family Parameters. Note: when loading a family that contains “Shared” families, both the “Lighting Device 1” and “Lighting Device 2” families will load into the project. Consider this when naming the “Lighting Device 1” family. The prefix “SA_” (shared annotation – helps identify what the family is for.) Load “Lighting Device 1” into “Lighting Device 2” and insert it on the “Front” work plane. Create additional work planes “Left”, “Right”, and “Back” with the “Plan Symbol Slope” parameter. Insert “Lighting Device 1” on each of these work planes. Doing this accounts for the rotation of the fixture. Repeat this process for each type of plan symbol loaded in the family if the Label Parameter is used. Optionally create in only one elevation and add a design line type to assist in placing this family in the correct orientation. Without this design line, if the fixture is not at the correct rotation, the family will not appear until the rotation is correct. It could be that the rotation is correct, but the slope may be wrong.

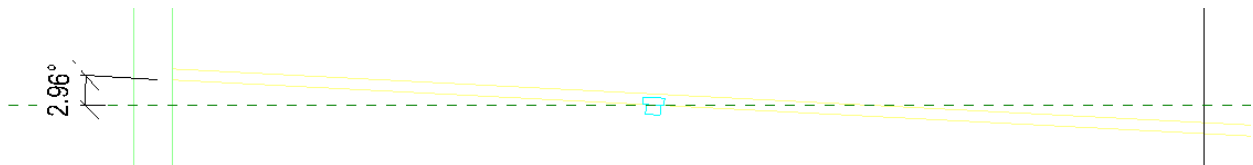
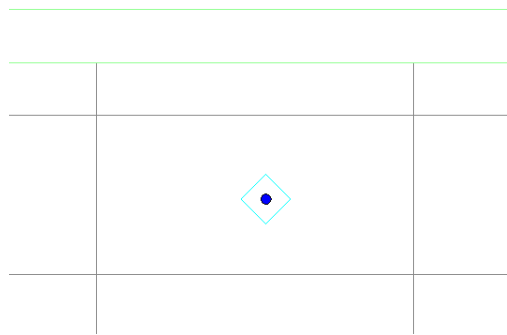


For this reason it is recommended that an arrow is placed in the family to match the slope direction. Draw the arrow using model lines with the <Invisible Lines> subcategory. This will prevent the arrow from showing up in sections. It will only appear when hovering over the fixture. You can also apply the visibility parameter called “Plan Symbol Visibility”.

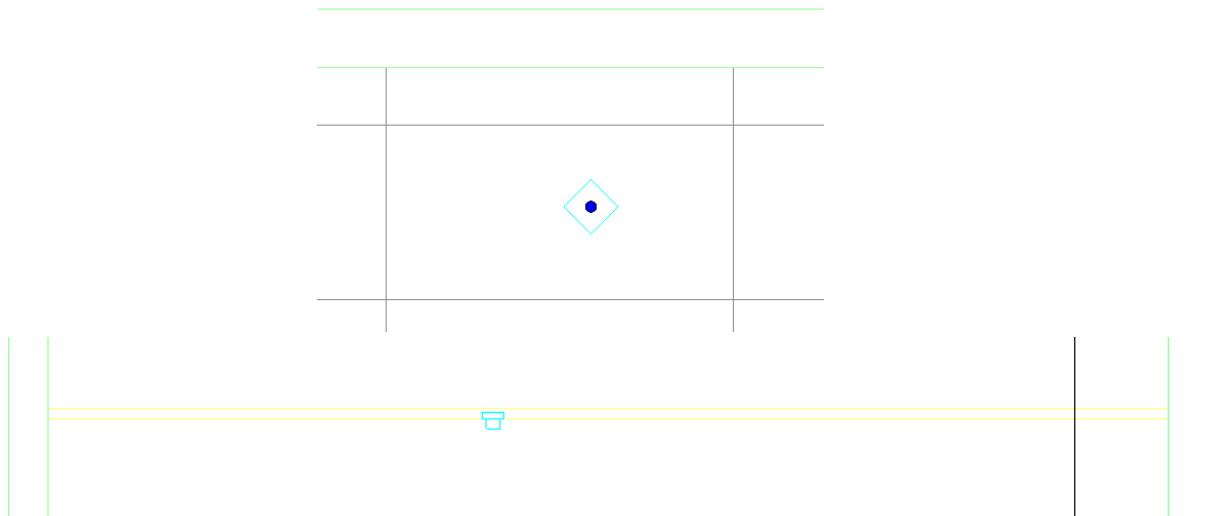


Next add a parameter called "Plan Symbol Visibility". This parameter will be yes/no parameter and have a formula driven by the "Plan Symbol Slope" so that if there is no slope, only 1 will appear. Apply this parameter to the "Lighting Device 1" that is placed on the "Left", "Right", and "Back" planes. When placed this fixture on a sloped ceiling, Revit will not show the 3 symbols that are not parallel to the floor.

SLOPED CEILING



FLAT CEILING



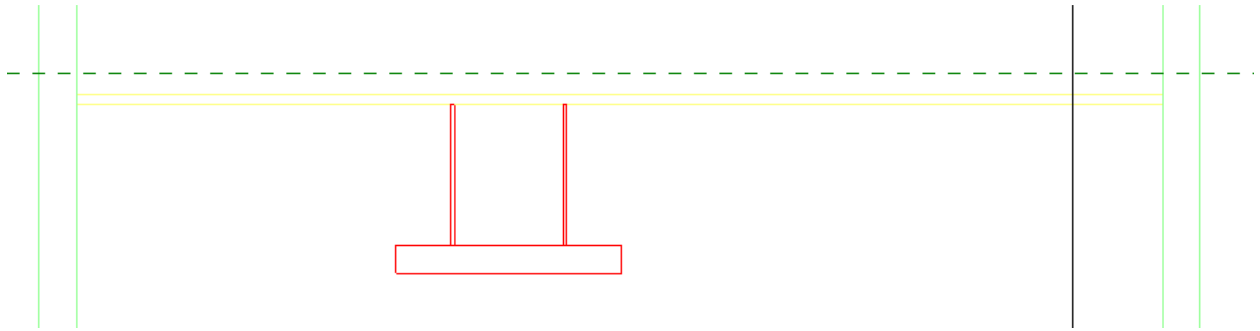
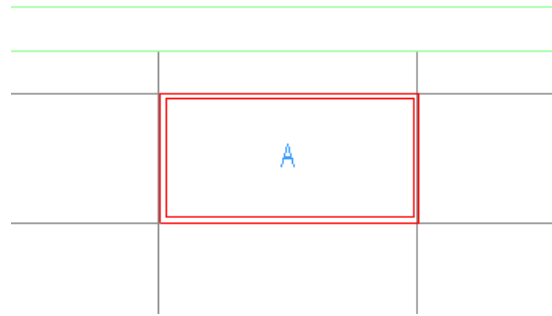
Group 2. Repeat the steps above, except there is no Generic Annotation Family. Just nest “Lighting Device 1” into “Lighting Device 2” on all four of the reference planes and apply the visibility parameter to 3 of the nested families.

Group 3. Since this is not a symmetrical family, the user has to be aware of what orientation the fixture needs to be. Use just the space bar to rotate the family, can still result in the 3d representation being wrong. To fix this, add a parameter called “rotation” to the 3d representation family to rotate it 90 degrees.

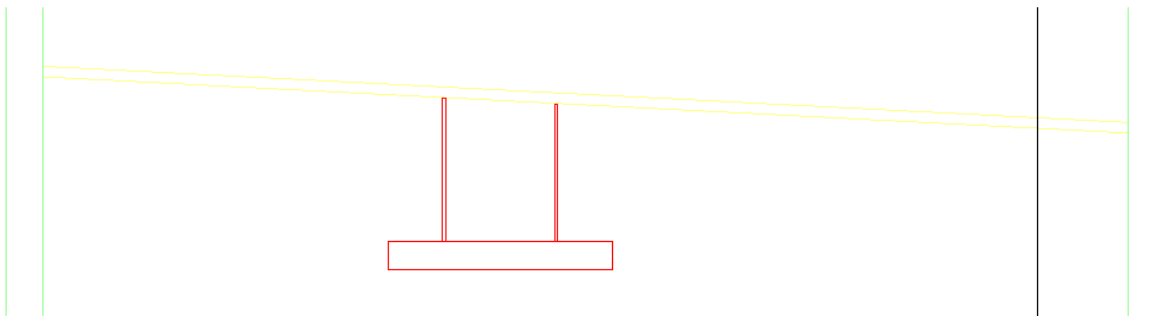
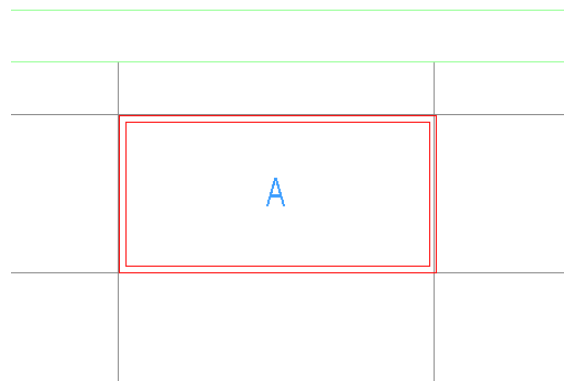
Group 4. This category is the same as category 2, except the plan symbology is nested. The families only need to be nested into the front reference plan. To aid in the placement of this family, it is recommended that a design line type is added to assist in the placing of the family in the correct orientation.

Group 5. This group is the same as Category 4. Add the parameter called “rotation” to the 3d representation family to rotate 90 degrees. Depending on the orientation, users will also need to add a formula to adjust the length of the pendant stems so that they touch the ceiling instead of stopping short or going too far. By calculating the distance from the stem to the center of the fixture, along with the ceiling slope, users can specify two separate lengths for the stems with the trigonometry formula “xxxxx”

FLAT CEILING



SLOPED CEILING



These options give the best of both worlds given our limitations in Revit. Users get accurate 3d representation for modeling and coordination reviews and consistent symbols throughout the construction drawings that will also make your clients happy. The examples shown are based on electrical families, but the same concepts can apply to any ceiling mounted devices.